Hand Hygiene in the Patient Care Setting
Where are we, and where are we heading?
Disclosure

- **Name**
- **Potential Conflicts of Interest**
  (e.g. employee of 3M, sponsored by 3M, etc.)

Course Overview:

A Little History

People and Environment, recent article review

Tools, Multi-modal and implementation

Hand hygiene monitoring tomorrow
Objectives:

Hand Hygiene in the Patient Care Setting
Where are we, and where are we heading?

1. Review the objectives of hand hygiene compliance
2. Review findings of current literature, projects and success
3. Look at WHO and TJC observation strategies
4. Look at multi-modal strategies for success
5. Identify tools to aid compliance and sustainability
6. Look at several new technologies for monitoring compliance
### Healthcare Associated Infections & Risk Factors

<table>
<thead>
<tr>
<th>Infection Type</th>
<th>Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urinary Tract Infections</strong></td>
<td>Advanced age, Severe underlying disease, Urolitiasis, Pregnancy, Diabetes</td>
</tr>
<tr>
<td><strong>Lower Respiratory Tract Infections</strong></td>
<td>Central nervous system depressants, Antibiotics and anti-acids, Prolonged health-care facilities stay, Malnutrition, Advanced age, Surgery, Immunodeficiency</td>
</tr>
<tr>
<td><strong>Surgical Site Infections</strong></td>
<td>Surgical intervention duration, Type of wound, Poor surgical asepsis, Diabetes, Nutritional state, Immunodeficiency, Lack of training and supervision</td>
</tr>
<tr>
<td><strong>Blood Infections</strong></td>
<td>Severe underlying disease, Neutropenia, Immunodeficiency, New invasive technologies, Lack of training and supervision</td>
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### Lack of Hand Hygiene

“Healthcare workers’ hands are the most common vehicle for the transmission of healthcare associated pathogens from patient to patient, and within the healthcare environment”.

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Hand Hygiene….  
and relationship to infection prevention

- 1847 Ignaz Semmelweis opened the discussion around hands carrying “cadaverous particles” and possible cause of puerperal fever mortality following childbirth. Reducing incidence from 20% to about 2% with antiseptic hand cleansing.

- 1850’s Florence Nightingale identified personal hygiene and sanitary environment as essential elements to healing, beginning during a cholera outbreak in London and then taking the call to improve sanitary conditions at the military hospital in Constantinople during the Crimean war and reduce the hospital death rate significantly.

- 1860-1870 Joseph Lister applied discoveries of Louis Pasteur and Robert Koch to the surgical environment with carbolic acid to reduce wound infections.
“Depending on the type of infection, HAI’s can occur between 24 to 72 hours after hospital admission, 3 to 10 days following discharge, or within 30 to 90 days after surgical procedure.”

“At any given moment, 2 million to 10 million bacteria can be found from the fingertips to the elbows of a human being.”

A mixture of both resident and transient bacteria.

“Cross contamination can occur every time healthcare personnel come in contact with a patient, other personnel, or the environment.”¹

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Hand Hygiene

Primary measure to reduce infections
(WHO)
Most effective and least expensive means of preventing and controlling infections (AORN)

Focus:
killing microorganisms while maintaining skin integrity
My 5 Moments, Hand Hygiene indications for action

Also:
- Before and after eating,
- Before and after using the restroom
- Before leaving the health care facility

WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care.
Hand Hygiene and Product Choices

Handwashing
- Remove soil, spores and destroy transient microorganisms
  - Soap & Water
  - Antimicrobial Soap & Water

Hand Decontamination
- Destroy transient microorganisms
  - Alcohol-based Hand Antiseptic (Rub)

Surgical Hand Antisepsis
- Destroy transient microorganisms and reduce resident flora
  - Antimicrobial Scrub Agent
  - Alcohol Based Surgical Hand Antiseptic (Rub)

Administrative Areas
- Public Areas
- Restrooms

Patient Care Areas

Procedural Areas
The Goal:
Continue to improve hand hygiene compliance

• Despite the long history and body of evidence, and commonly shared importance of hand hygiene in preventing infection, hand hygiene compliance remains low across healthcare settings.

• Research continues to develop new product formulations, delivery methods, and new methodologies to increase adoption of hand hygiene practices across all settings.

• We must consider the patients role in hand hygiene and pathogen transmission, as well as family members and visitors hand hygiene practice.

• Hand hygiene compliance within health care practitioners is often around 30-60%\(^6\). A recent study indicated hand hygiene practice as low as 4% for visitors and 0% for patients within a hospital setting.\(^1\)
Not just a piece of the puzzle, a significant piece

• Hand Hygiene cannot control disease transmission by itself, it is only one component of a comprehensive HAI reduction program.
• Hand Hygiene does offer the simplest and most effective solution to break the chain of transmission, maximize patient safety, and improve healthcare outcomes.

• The Joint Commission: 4 patient safety goals for ASCs in 2016
  1. Identify patients correctly
  2. Use medications safely
  3. Prevent infection – *Use CDC and WHO hand cleaning guidelines and use proven guidelines to prevent postoperative infection.*
  4. Prevent mistakes in surgery
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A commonality, low compliance

- Tompson D, et al (2016) identified the following, “despite high levels of report of hand hygiene education and observed supply availability, ...observations of hand hygiene and aseptic injection technique showed lack of similarly high behavior compliance.” “Infection prevention and injection safety knowledge does not always translate into appropriate practice.”

- Lytsy B et al (2016) states, “Hand hygiene improvement activities need to be continuous; otherwise, after an initial successful intervention period, the compliance with hand hygiene recommendations tends to decline”.

- Shabot MM, et al.(2016) published results from their 2010 evaluation of hand hygiene at 12 hospitals from the greater Houston area. Based on 31,600 observations the system wide hand hygiene compliance at the beginning of their study averaged 58.1%. We’ll identify their strategy to success in upcoming slides.
So which direction should we look, is success possible? YES! How will you know?

• Direct observation monitoring has been considered the best monitoring method for data collection.
  • Two techniques are used for this method,
    • WHO’s “My 5 Moments” & Entry/Exit method

• New developments in monitoring:
  • Measuring product usage has been used to identify hand hygiene compliance.
  • Electronic monitoring with chip surveillance attached to ID badges and monitored through Entry/Exit opportunities
So which direction should we look, is success possible? YES! How will you know?

- Observation techniques have their limitations:
  - Direct Observers may not always have a good line of sight to opportunities for hand hygiene, entry/exit accounts for only two points along the “M5M” World Health Organization protocol.
  - Measuring product usage need an accurate denominator to help correlate to opportunity. Will it be based on M5M, entry/exit, or patient days and personnel?
  - Electronic monitoring and even video monitoring can be costly and requires additional personnel to manage and review the monitoring system data.
  - All observation techniques require, dedication to process, accurate data gathering and communication of results.
Monitoring compliance

Nai-Chung N. Chang et al., *Feasibility of monitoring compliance to the My 5 Moments and Entry/Exit hand hygiene methods in US hospitals*.²

Goal: to compare the ability to observe opportunities of hand hygiene under covert direct observation.

Specifics: each separate entry and exit was counted as a distinct episode for hand hygiene.

Difficulties: direct visual access to private rooms for M5M observations and the Hawthorne effect introduced possible bias.

Conclusion: physical infrastructure needs to be considered prior to identifying a specific monitoring strategy.
Outpatient observation of hand hygiene practice

Thompson et al, *Using medical student observers of infection prevention, hand hygiene, and injection safety in outpatient settings: a cross-sectional survey*\(^3\)

Goal: use medical students trained as observers of infection prevention strategies in outpatient settings to assess improvement opportunities

Specifics: 15 outpatient sites participated in direct observation surveys. 330 successful observations were made. 253 physician, 43 RN, 23 MA, 11 other. Soap dispensers available at 100% of sites and alcohol-based hand rub available at 13 sites.

Hand hygiene behavior report: 63% compliance across all user opportunities (MD, RN, MA).
“The teacher arrives when the student is ready” reportedly an old Chinese proverb

Watson J., *Role of multimodal education strategy on health care worker’s handwashing*  

Identified the importance of each individual being actively involved with the environment, select their own role models, and regulate their own attitudes and actions towards learning.

Behavioral factors such as attitude, social influence and self-efficacy - (one’s belief in success and accomplishing a task), play a large role in hand hygiene compliance.
Watson J, *Role of multimodal education strategy on health care worker’s handwashing*<sup>6</sup>

Multimodal tools;

• computer classroom hand hygiene education module,
• posters and brochures in strategic locations,
• researchers making frequent round to answer questions related to M5M,
• immediate feedback on observations during rounding,
• participants involved in follow-up survey during evaluation.
Watson J. *Role of multimodal education strategy on health care worker’s handwashing*\(^6\)

“Is there a significant difference in hand hygiene compliance rates among the pre-multimodal strategy intervention program to post-multimodal strategy intervention program?”

Pre-hand hygiene intervention rates “others” 64%, RNs 49%, MDs 38%

The overall hand hygiene compliance rates for this study increased from 51.3% to 98.6%.
What blocks action toward compliance?

Thompson, et al.\textsuperscript{3} again provides non-use data;

- Skin irritation, interference with worker-patient relationships, wearing of gloves, high workload, understanding of protocols, and location or non-ergonomic location of product, these have all been reported as reasons for non-participation in practice

Lytsy et al\textsuperscript{4}, supports these observations

- Her team identified reasons provided for not performing a handrub practice: no time, no handrub available, nobody else does it, bad for the skin, fear of skin reactions, handrub not important, glove use instead of hand hygiene.
Skin Damage Associated With Hand Hygiene

- **Irritant**
- **Allergic**
- **Hypersensitivity**
Skin – a complex organ

Transient Flora:
- Also called contaminating or non-colonizing
- Cannot multiply on dry skin
- Easily removed by hand washing (as compared to resident flora)
- Generally not so long-lived
- Occasionally isolated from skin
- Not consistently present in most people
- Thought of as skin contaminants

Resident Flora:
- Also called colonizing flora
- Cannot be removed by hand washing
- Numbers remain stable for long periods
- Permanent residents of skin
- Persistently isolated from skin of most people
- May not be desirable to alter resident flora – “colonization resistance”
The Beneficial Effect of Education

- Statistically significant decrease in infection rates after intervention
- Beneficial effect of education apparent in teaching and nonteaching institutions

Right people, right products, right processes
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Elements of Hand Hygiene

- Recognize hand hygiene opportunities
- Selection of appropriate hand hygiene agent
- Dispense an efficacious dose of hand hygiene agent
- Appropriate application technique and time
What tools can help raise compliance?

Pincock, Ted RN,CIC Bundling hand hygiene interventions and measurement to decrease health care-associated infections., AJIC

Complexities of the health care environment and difficulty changing behaviors remains a significant challenge.

Individual approaches or interventions are ineffective in achieving sustainability and behavior change.

Coordinated multimodal approaches to increasing compliance are few and disassociated from HAI data.

Data tracking hand hygiene compliance dominated published results, but association to reduced infection rates is often not discussed.
“Bundling elements may include the use of instruments, products, and environmental considerations, as well as behavior modification techniques.”

In Bundling, the omission of any of the individual elements can translate to an increased risk of infection transmission.
8 key components of a hand hygiene bundle, T. Pincock

1. Establish ongoing monitoring and feedback on infection rates
2. Establish administrative leadership and support
3. Establish a multidisciplinary design and response team
4. Provide ongoing education and training for staff, patients, families and visitors.
5. Ensure hand hygiene resources are accessible facility wide and at the point of care
6. Reinforce hand hygiene behavior and accountability
7. Provide reminders throughout the health care setting
8. Establish ongoing monitoring and feedback of hand hygiene compliance.
The Joint Commission,
Journal on Quality and Patient Safety

M. Michael Shabot, MD, Chief Clinical Officer, Ex.V.P.
Utilizing Targeted Solutions Tools (TST)
Memorial Hermann Health System,
12 hospitals in the greater Houston, TX area.

One goal: become a HRO, Highly Reliable Organization in zero harm for both patients and care providers

1st objective reduce HAIs through improved hand hygiene compliance.

Tool: TST using Robust Process Improvement (RPI) and web based tracking of process and outcomes
Targeted Solution Tool – how did the Hermann system move forward?

Dividing the project into 3 time periods;
1) Baseline - collect current data on hand hygiene compliance
2) Improve – improvement implementation strategies
3) Control – assess sustainability of improvements

Hand Hygiene Goal: improve each unit's performance by 30% above baseline or to 90% compliance within 1 year following implementation
Targeted Solution Tool – what did the Hermann system measure moving forward?

Achieving compliance and a correlation to outcomes of reduced HAIs measured as decrease in CLABSI and VAP

Critical success factors:
• Leadership support, at each facility the CNO was the executive sponsor
• MBB (Master Black Belt, 6 Sigma) project leadership in DMAIC (Define, Measure, Analyze, Improve, Control)
• Allocation of necessary resources, staffing and time
• Education and time preparing all involved personnel during the initial phases before intervention implementation
51 month committed time length to this project, with 25 months of sustained hand hygiene improvement following interventions.

Baseline levels of hand hygiene compliance at 58.1%, increased to 94.7% during the first 13 months following intervention and increased to 95.6% for the last 12 months included in the study.

Baseline rates for CLABSI and VAP, 0.83 and 1.04 improved to 0.63 and 0.57, respectively.

Measured and ranked 15 individual reasons for non-compliance to hand hygiene use, (1- glove use, 2- frequency of entry/exit, 3 –hands full of supplies, 4 – forgot)

Although strategy and measurements are identified, specific practice and education interventions and reinforcements not identified
What is Multi-modal approach to intervention?
• Incorporates culture change
• Leadership support for programs of change
• Education and training
• Compliance monitoring
• Multidisciplinary team
• Accessible products
• Visible reminders in the workplace
• Outcome monitoring and reporting
Single strategy interventions have demonstrated a lack of success or sustainability. Regulatory agencies have identified the need for multimodal strategies toward hand hygiene compliance. The key to success in a multimodal approach is coordination of components and team members. Cultural change requires coordination, oversight and leadership, (and patience in a culture of safety). Comprehensive programs should include specific strategies aimed at behavioral change.
APIC Implementation Guideline:  
Guide to Hand Hygiene programs for Infection Prevention

Despite technological breakthroughs in product composition, delivery and availability of tools, human behavior continues to be the single greatest source of variation of healthcare related outcomes.¹  

Positive Deviance approach and Frontline Leadership approach both offer opportunity for change deriving from the culture into which a change is desired.  
Both ask the question of change strategy to those involved within the change and although the pathways are different the directions for change are generated by those involved.
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When monitoring hand hygiene activity the first question to be asked is what timing approach are you looking to monitor? Two main approaches in time are the entry/exit and M5M, or My 5 Moments from the World Health Organization. Regardless of which is selected a standardized approach to monitoring and measurement is important. The Hawthorne Effect, actions based on knowing you’re being observed, may impact the data and present bias so this effect must be considered. Individuals performing the monitoring must all be trained to conduct the monitoring in a standardized manner.
APIC Implementation Guideline: Where are we and what’s next for Hand Hygiene monitoring?

APIC identifies 3 categories of technological monitoring;
Real time locating systems (RTLS) and other electronic activity monitoring, track staff and hand hygiene activity.
Dispenser associated monitoring systems developed to provide measurements of dispensing activations. Some technologies include audible and visible green light and vibrations on the wearer’s badge as a hand hygiene reminder.
Video surveillance with cameras placed at sinks or dispenser areas. Reviewers monitoring from off site grade opportunities as either a “Pass or Fail” for compliance.
APIC Implementation Guideline:
Where are we and what’s next for Hand Hygiene monitoring?

Alternative monitoring methods; questions to be considered
Product usage and dispenser associated systems—carries an underlying assumption that a change in product use correlates with a change in hand hygiene practice. This is also limited by not having a true denominator of hand hygiene opportunities to actual usage.

Video monitoring requires purchase and installation of equipment as well as staffing for monitoring and gathering of data.

RTLS, Real time locating systems may offer a monitoring solution as communication technologies expand to include product usage and opportunities based on care provider movements.
APIC Implementation Guideline:
Where are we and what’s next for Hand Hygiene monitoring?

“It should be noted that interactive technologies present only one available tool, and may not be the solution to bring about permanent change. The technology is useless if individuals are not motivated to take advantage of what the technology has to offer. Systems need to be structured in ways that not only build motivation and self-management skills, but also guide habits. Unfortunately, those who need the guidance most may use the tools the least”
Review –

Compliance and Sustainability are achievable.

1. Despite the long history and body of evidence, and commonly shared importance of hand hygiene in preventing infection, hand hygiene compliance remains low across healthcare settings.

2. “Infection prevention and injection safety knowledge does not always translate into appropriate practice.”

3. Behavioral factors such as attitude, social influence and self-efficacy - (one’s belief in success and accomplishing a task), play a large role in hand hygiene compliance.

4. Despite technological breakthroughs in product composition, delivery and availability of tools, human behavior continues to be the single greatest source of variation of healthcare-related outcomes.

5. Cultural change requires coordination, oversight and leadership, (and patience in a culture of safety).
Questions?
References:

4. Lytsy, Birgitta MD,PhD, et al, A joint, multilateral approach to improved compliance with hand hygiene in 4 countries within the Baltic region using the World Health Organization’s SAVE LIVES: Clean Your Hands model. AJIC (2016)
6. Watson, Jo Andrea RN,DNP,MSN,CCRN,CPAN, Role of a multimodal educational strategy on health care workers’ handwashing. AJIC 44 (2016) 400-4
8. The Joint Commission Center for Transforming Healthcare, centerfortransforminghealthcare.org
11. B. Allegranzi a,*, D. Pittet Role of hand hygiene in healthcare-associated infection prevention Journal of Hospital Infection (2009) 73, 305e315
Thank You for your participation